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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/657,192	09/09/2003	Taro Yajima	031112	1622
23850	7590	04/27/2005	EXAMINER	
ARMSTRONG, KRATZ, QUINTOS, HANSON & BROOKS, LLP 1725 K STREET, NW SUITE 1000 WASHINGTON, DC 20006			VERSTEEG, STEVEN H	
			ART UNIT	PAPER NUMBER
			1753	

DATE MAILED: 04/27/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/657,192

Applicant(s)

YAJIMA ET AL.

Examiner

Steven H. VerSteeg

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 14 March 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 13 is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☒ Claim(s) 11 and 12 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 September 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 3/10/05 & 9/9/03.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Information Disclosure Statement***

1. The references crossed out on the IDS are duplicates of references already cited on a previously submitted IDS.

### ***Drawings***

2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: **23** (see Figure 1) and **122** (see Figure 5). Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Specification***

3. The disclosure is objected to because of the following informalities: "FR" should be "RF" on page 1 at line 23; page 2 at line 21; page 6 at lines 2 and 25; and page 12 at line 13.  
Appropriate correction is required.

***Claim Objections***

4. Claims 1-12 are objected to because of the following informalities: “FR” should be “RF” in claim 1 at line 3 and in claim 2 at line 3 and in claim 5 at line 4 and claim 8 at line 5 and claim 9 at line 3; in claims 5-7, the references to a “second” variable inductance elements, main winding, control winding, and control power source appears to be misplaced because there has been no previous reference to a “first” item. Claims 3 and 4 depend from claim 1 and contain all of the limitations of claim 1. Therefore, claims 3 and 4 are objected to for the same reasons as claim 1. Claim 8 depends from claim 2 and contains all of the limitations of claim 2. Therefore, claim 8 is objected to for the same reasons as claim 2. Claims 10-12 depend from claim 9 and contain all of the limitations of claim 9. Therefore, claims 10-12 are objected to for the same reasons as claim 9. Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 3 and 4 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

7. Claim 3 recites the limitation "said first control winding" in line 4. There is insufficient antecedent basis for this limitation in the claim.

8. Claim 4 depends from claim 3 and contains all of the limitations of claim 3. Therefore, claim 4 is rejected for the same reasons as claim 3. Please note that claim 4 also refers to “said

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first control winding". While there is antecedent basis in claim 3, a change to claim 3 may or may not necessitate a change to claim 4.

***Claim Rejections - 35 USC § 102***

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

10. Claims 1-10 are rejected under 35 U.S.C. 102(b) as being anticipated by US 6,252,354 B1 to Collins et al. (Collins).

11. For claim 1, Applicant requires a matching box connected to a plasma generator for changing at least one of a phase of current and a phase of voltage of RF power inputted from a RF source and outputting phase-changed RF power to the plasma generator, the matching box comprises a variable inductance elements that includes a main winding for determining impedance of the variable induction element and a control winding magnetically coupled to the main winding wherein an impedance of the main winding is controlled based on a magnitude of direct current flowing through the control winding.

12. For claim 2, Applicant require a matching box having a high voltage side output terminal connected to a plasma generator, an input terminal connected to an RF source, and a first variable inductance element that comprises a first main winding connected to the input terminal and high voltage side output terminal and a first control winding magnetically coupled to the first main winding; wherein an impedance of the first main winding is controlled based on a magnitude of direct current flowing through the first control winding.

13. For claim 5, Applicant requires a matching box comprising a high voltage side output terminal connected to a plasma generator; an input terminal connected to an RF source; a ground side output terminal connected to ground voltage, and a variable inductance element that comprises a main winding connected to the ground side output terminal and a control winding magnetically coupled to the main winding wherein the main winding is controlled based on a magnitude of direct current flowing through the control winding.

14. For claim 9, Applicant requires a vacuum apparatus comprising a vacuum chamber; an RF source; a matching box having a variable inductance element, and a plasma generator connected to the RF source via the matching box wherein the variable inductance element is connected between the RF source and the plasma generator, and wherein a target object disposed in the vacuum chamber is subjected to vacuum processing.

15. Collins discloses an RF plasma source (abstract) comprising a matching box **150** that comprises a variable inductance element **230** that includes a main winding **232** and a control winding **236** that is magnetically coupled to the main winding through the magnetically permeable core **234**. The impedance of the main winding is controlled based upon a magnitude of the current flowing through the control winding (col. 2, l. 7-46). The main winding is connected to the RF power supply **140** through input **150a** and is connected to the output to the high voltage output terminal (Figure 1A).

16. For claims 3 and 6, Applicant requires a first control power source that supplies power to the control winding. There is a current source **238** that supplies power to the control winding.

17. For claims 4 and 7, Applicant requires a first control circuit that produces a signal that changes a magnitude of the current sent to the control winding. A control circuit **200** is present.

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18. For claim 8, Applicant requires the matching box to comprise a high voltage side output terminal connected to a plasma generator; an input terminal connected to an RF source; a ground side output terminal connected to ground voltage; and a second variable inductance element that comprises a second main winding connected to the input terminal and the ground side output terminal; and a second control winding magnetically coupled to the second main winding wherein the second main winding is controlled based on a magnitude of direct current flowing through the second control winding. Figure 1 shows that there is also a second variable inductance element **185** that comprises a second main winding and second control winding.

19. For claim 10, Applicant requires the variable inductance element to comprise a main winding and a control winding magnetically coupled to the main winding wherein a magnitude of the direct current flowing through the control winding controls the impedance of the main winding. As noted above, the plasma apparatus has the main winding **232** and the control winding **236**.

***Allowable Subject Matter***

20. Claim 13 is allowed.

21. Claims 11 and 12 would be allowable if written to overcome the claim objection presented above.

22. The following is a statement of reasons for the indication of allowable subject matter: it is neither anticipated nor obvious over the prior art of record to have a vacuum apparatus as claimed by Applicant in claims 11 and 12 or a method of vacuum processing as claimed by Applicant in claim 13.

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23. Collins does not disclose or suggest a coil surrounding the chamber or a first electrode in an opening of the chamber and a second electrode farther from the chamber than the other electrode or an electron injector or regenerating plasma that disappears. Modifying Collins to provide the limitations would require hindsight.

### ***General Information***

For general status inquiries on applications not having received a first action on the merits, please contact the Technology Center 1700 receptionist at (571) 272-1700.

For inquiries involving Recovery of lost papers & cases, sending out missing papers, resetting shortened statutory periods, or for restarting the shortened statutory period for response, please contact Denis Boyd at (571) 272-0992.

For general inquiries such as fees, hours of operation, and employee location, please contact the Technology Center 1700 receptionist at (571) 272-1300.

### ***Conclusion***

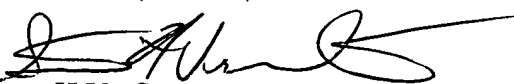
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Steven H. VerSteeg whose telephone number is (571) 272-1348. The examiner can normally be reached on Mon - Thurs (6:30 AM - 5:00 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam X. Nguyen can be reached on (571) 272-1342. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.



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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
Steven H VerSteeg  
Primary Examiner  
Art Unit 1753

shv  
April 25, 2005